# BACKFILLING PLAN


JORGENSEN FORGE EARLY ACTION AREA

Jorgensen Forge Corporation Property
Seattle, WA

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# 1.0 Purpose & Objective

The purpose and objective of the Backfilling Plan is to describe the means and methods to perform the placement of clean backfill materials during construction of the Jorgensen Forge Early Action Area cleanup. The plan will identify and detail the following items during placement of clean backfill materials:

- Work sequence and equipment
- Source of backfill materials
- Means and methods for survey and positioning control
- Means and methods for environmental protection and monitoring
- Means and methods for commercial traffic coordination
- Means and methods for backfill placement

# 2.0 Work Sequence & Equipment

## 2.1 Work Sequence

Backfill activities will be performed from upstream (south end of Jorgensen Forge shoreline) to downstream (north end of Jorgensen Forge shoreline). Backfilling will begin in the cofferdam area as part of the Schedule A activities followed by in-water areas, which will be performed ahead of shoreline areas. This is due to removal within the cofferdam requiring removal first and the dredge design requiring a toe trench and layered shoreline backfill to elevations below the mean lower low water (MLLW) elevation. The majority of all in water dredging and all excavation upland will be completed prior to beginning full backfill operations. Backfilling will be performed in two separate phases. An initial "interim" backfill layer will be placed following completion and approval of in-water removal within the designated Dredge Management Units (DMUs) (Figure 1). The objective of this placement is to minimize resuspension of loosely consolidated sediments on the sediment surface until final backfill operations begin. The overall detailed work sequence would be as follows:

1. Remove all shoreline soil and debris in accordance with the Construction Drawings.
2. Remove all materials identified in the plans within the cofferdam in accordance with the Construction Drawings and Specifications. Once all materials are removed to the design elevations, the area within the cofferdam will be surveyed and approved by the Owner's Project Engineer. Approximately 6-inches of interim backfill will be placed within the cofferdam following approval by the Owner's Project Engineer that all of the design removal elevations have been achieved.
3. Begin dredging in-water sediment in accordance with the Construction Specification and Drawings.
4. Dredging operations will take place from Monday through Saturday. The DMUs

that were completed during those six days will be hydrographically surveyed per the Survey Plan and sent for approval to the Owner's Project Engineer. A 50' buffer will be maintained between areas being dredged and the areas receiving the 6" backfill to reduce the potential for dredging residuals to settle on "interim" placed backfill.

5. On Saturday, after dredging has been completed for that day, the dredge bucket and boom will be decontaminated using a "hotsie" pressure washer equipped with a detergent/surfactant additive reservoir, to remove all soils and sediments. The detergent of choice shall be a water/Alconox™ mixture. The decontamination will occur on the sediment barge so the water generated can be removed with the dewatering pumps and treated in the water treatment system.

6. On Sunday the in-water "interim" sand backfill will be placed below the toe trench identified in Construction Drawings starting from the south end and working north to the extent of the Owner's Project Engineer-approved DMUs completed that week.

7. Steps 3-5 will continue until all in-water dredging has been completed and approved by the Owner's Project Engineer.

8. After all dredging is complete and all DMUs are approved by the Owner's Project Engineer, the placement of the "final" 2-foot lift of in-water sand backfill below toe trench continuing from the south end to north extents of backfill will be completed. Prior to placing the final 2-foot lift, the cofferdam will be removed. This will allow for the final 2-foot lift and the shoreline containment to be placed uniformly within and outside the cofferdam.

9. This process will be completed moving from the south end of the project to the north end of the project until all backfill materials have been placed. Upland backfilling at some times will be performed concurrently (and lagging behind) in-water backfill placement to minimize slope instability.

10. Following Owner's Project Engineers approval that all in-water dredging is complete, begin placement of the in-water shoreline containment filter materials will be performed from base of the toe trench to approximately +4' MLLW starting from south end and working north to the project extents.

11. Following Owner's Project Engineers approval of toe trench construction in Step 10, begin placing shoreline containment filter materials from approximately +4'MLLW to top of shoreline starting from south end and working north to the project extents.

12. Following Owner's Project Engineers approval of placed shoreline containment filter materials in Step 11, begin placing in-water riprap from base of toe trench to approximately +4'MLLW starting from south end and working north to the project extents.

13. Following Owner's Project Engineers approval of placed shoreline containment riprap materials in Step 12 begin placing shoreline riprap at approximately +4'MLLW to top of shoreline starting from south end and working north to the project extents.

14. Following Owner's Project Engineers approval of placed shoreline containment riprap materials in Step 13, begin placing in-water habitat substrate materials from

base of toe trench to approximately +4'MLLW starting from south end and working north to the project extents.

15. Following Owner's Project Engineers approval of placed shoreline containment riprap materials in Step 13 and in-water habitat substrate materials in Step 14, begin placing shoreline habitat substrate materials from in-water elevation stopping point at approximately +4'MLLW to top of shoreline starting from south end and working north to the project extents.

## 2.2 Equipment

Placement of in-water backfill will utilize the following equipment:

- The Web Barge equipped with a 1200 Hitachi would place all imported material to a +4' MLLW. The backfill material, and shoreline containment filter material and habitat substrate, will be placed by the 1200 Hitachi equipped with a 4 cubic yard rehandling bucket (Figure 2). Placement of the riprap material may occur using the excavator equipped with a traditional thumb and bucket for more precise placement.
- Two 2,000 ton capacity barges. During the placement of the interim backfill only one barge will be used. Once all dredging has been approved by the Owner's Project Engineer and final backfill operations take place, two barges will be used.
- The Sonja H. tugboat will be used to transport the barges to and from CalPortland's Seattle Aggregate yard. The Sonja H. is a 500HP tug that is 50' long.
- The Fog Dog survey boat will be used to perform the bathymetric surveying. It is a 27' Almar Aluminum hulled jet drive, powered by a Cummins diesel engine. The survey equipment consists of a Reson SeaBat 7125 multibeam head and processor, with positioning provided by an Applanix POS MV RTK GPS system. The Multibeam head is mounted on the starboard side and pivots up and out of the water for travel/transport. The vessel has dual displays for the operator and survey tech, inverter, extra-large battery bank and auxiliary generator for ample power capacity. It also has on board cellular internet access and wifi connectivity so that surveys or troubleshooting can be done remotely.

Shoreline containment placement operations will utilize the following equipment:

- One 470 Hitachi excavator equipped with a long-reach arm with a 4 cubic yard rehandle bucket. The long reach will place and grade all the backfill material from approximately a +2 to +4' MLLW elevation and above depending on tides.
- One 450 Hitachi excavator equipped with a standard arm and traditional thumb and bucket. This excavator will assist in placing riprap along the shoreline.
- One JD 824 front-end loader will be used to place the backfill material in windrows for easier grading for the excavator.
- Approximately 2-3 truck and trailers will be used to import the backfill material from CalPortland's Seattle Aggregate yard. Material will be directly offloaded into the backfill areas and placed that day. Due to the

cost effectiveness and the constricted nature of the site, stockpiling is not anticipated. However, in the event the aggregate producer cannot keep up with daily production, material maybe stockpiled to ensure productions can be maintained.

## 2.3 Hours of Operations

The hours of operation the site will be available for work will be 24-hours a day, 7 days a week for the duration of the project, per the project schedule. During low tide windows, which vary at time throughout the work period, shoreline excavation and backfill/containment placement will take place. The work schedule for shoreline excavations will be a 10-hour shift and will happen Monday through Saturday. The shoreline backfill and shoreline containment work schedule will be a 10-hour shift and will happen Sunday through Saturday.

During high-tide windows, which vary at time throughout the work period, in-water dredging and backfill/contaiment placement will take place. The works schedule for in-water dredging will be a 12-hour shift and will happen Sunday through Saturday. The in-water backfill and shoreline containment work schedule will be a 10-hour shift and will happen Sunday through Saturday.

## 2.4 Durations for Material Types

### 2.4.1 Interim 6” Backfill

It will take approximately 8 crew days to place the “interim” six-inch backfill material. The backfill will be placed between at a minimum elevation of 6” and up to 24” inches above the post-dredge surface, depending on schedule and material availability. The backfill will be placed during one shift on Sunday; however, backfill may also take place Monday through Saturday depending on barge scheduling.

### 2.4.2 Final Backfill

It will take approximately 7.5 crew days to place the final backfill material. The final backfill placement will occur from the elevation of the interim backfill and proceed in to 2’ lifts until the minimum elevation for the required backfill line identified in the Construction Drawings is achieved.

### 2.4.3 Filter Material

It will take approximately 8 crew days to place the shoreline containment filter material. Six days placing with shoreline crews and two days with the barge crew.

### 2.4.4 Riprap Material

It will take approximately 13 days to place the shoreline containment riprap material. Ten days placing with shoreline crews and three days with the barge crew.

#### 2.4.5 Habitat Substrate Material

It will take approximately 8 days to place the shoreline containment habitat substrate material. Two days placing with shoreline crews and five days with the barge crew.

# 3.0 Positioning & Survey Control

## 3.1 Hydrographic Surveys

A final dredging survey will be performed within all DMUs at the completion of dredging activities. This final survey will be reviewed and approved by the Owner's Project Engineer to ensure the design removal elevations in the Construction Drawings throughout the in-water project extents have been achieved. Once backfill placement begins, a multi-beam hydrographic survey will be performed daily within backfilled areas until design final grades are achieved. More information regarding how the surveys will be performed can be found in the Survey Plan as a separate appendix within the RAWP.

## 3.2 Shoreline Surveys

A final shoreline survey will be performed within all areas excavated from the uplands at the completion of excavation activities. This survey may be performed in steps with the upland excavation being surveyed independently of the dredge areas. Additionally, a portion of the upland excavation areas may be surveyed from the survey boat during high tides. This final survey will be approved by the Owner's Project Engineer to ensure the design removal elevations in the Construction Drawings throughout the shoreline project extents have been achieved. Once backfill placement begins, grade checks will be performed daily by PPM until final grades for each layer are achieved. At that time, a final survey of that layer will be submitted to the Owner's Project Engineer for approval. An independent third-party professional surveyor licensed in the State of Washington will perform the in-field surveying. A more detailed discussion on upland surveys is included in the Survey Plan as a separate appendix to the RAWP.

## 3.3 Cofferdam Survey

Surveying within the cofferdam will use the same equipment as the shoreline surveys. An all terrian manlift will be positioned outside the cofferdam to be used to record survey data. A manlift opertor and surveyor will collect topo shots using the TopCon gear on an extended range pole. The data collected from the cofferdam survey will be sent to the Owner's Project Engineer for approval prior to placement of the interim backfill. This survey method will be used for measure and payment in both the base bid and Schedule A items.

## 3.4 Positioning Software & Equipment

#### 3.3.1 In-water Equipment

The 1200 Hitachi excavator will be equipped with RTK GPS hardware that is utilized by Hypack's Dredgepack software. This software provides the operator the visual controls to see where the bucket is vertically and horizontally in the dredge prism. The barge is also equipped with a heading sensor to determine its

orientation in the dredge prism. More information on these items can be found in the Survey Plan as a separate appendix to the RAWP.

### 3.3.2 Shoreline Equipment

Surveying on the shoreline will be performed using a Topcon FC250 data collector and GR5 receiver and base station. More information on this equipment can be found in the Survey Plan as a separate appendix to the RAWP.

### 3.3.3 Cofferdam Equipment

Surveying on the shoreline will be performed using a Topcon FC250 data collector and GR5 receiver and base station. A range pole will be used in conjunction with a low tide window to reach the depth of the excavation cut. More information on this equipment can be found in the Survey Plan as a separate appendix to the RAWP.

## 4.0 Methods & Procedure for Backfill Placement

### 4.1 In-water Placement Methods and Procedures

Backfill operations will consist of initial and final backfill operations. After the final dredge design grade has been completed, surveyed, and approved by the Owner's Project Engineer within a DMU, an initial layer of backfill of 6"-24" will be placed over the DMU. Once all DMUs and have been approved and received the initial layer of backfill, the intermediate backfill from 6"-2' below final backfill will occur. Once the intermediate backfill has taken place the barge will start the backfill process again until the final backfill grade has been meet. Initial, intermediate, and final placement will be performed using the Web barge and 1200 Hitachi Excavator. One of the material barges will be transported by the tug until it is rafted alongside the Web barge. A front loader will be on the backfill barge to assist in stacking material. The rehandle bucket will be swung to the material barge by the excavator to grab a bucket load of material. The bucket will then be swung by the excavator into place for backfill placement. In-water backfill will be released from the bucket as close to the backfill surface as possible to minimize free-fall velocity of materials and therefore generation of excess turbidity. A placement mark is recorded on the computer screen indicating areas previously covered.

### 4. 2 Shoreline Containment Placement Methods and Procedures

Shoreline containment placement will be performed by a combination of grade staking, visual placement methods, and the use of a grade checker equipped with an RTK-GPS unit. No shoreline containment materials will be placed in an area until the underlying in-water backfill elevations are approved by the Owner's Project Engineer in the same area. This is to reduce the potential of shoreline slope instability. Shoreline containment material will be brought to the site with truck and trailers and dumped directly onto the dry shoreline containment area for immediate installation. As material is brought to the

upland top of shoreline staging area, the 470 excavator will load the material into the bucket, place the material at the lowest elevation needed for material placement at that time, and pull the materials upland toward the excavator to the design layer thickness. As the excavator moves north, the grade checker will perform checks on the completed surface and mark where additional cut and fill is required to achieve the design elevations. The excavator will balance the cuts and fills, using additional material as necessary until the grade checker approves of the final surface. While the 470 is working to achieve final design elevations in a particular portion of the shoreline bank, the loader be stockpiling material ahead of the excavator for backfill placement. The riprap and habitat substrate materials will be placed using the 450 excavator. Riprap will be keyed in with pressure from the back of the excavator bucket to improve slope stability.

### 4.2.1 Filter Material

Special activities are required for the transport, installation, and placement of the filter material. As required by the Construction Specifications, the filter material shall be uniformly amended by blending granular activated carbon (GAC). Blended mix shall meet a minimum concentrate of 0.5 percent GAC by weight. This will be achieved by using CalPortland's custom auger blending system that is mounted directly to the conveyor system located in their Seattle Aggregate Yard. CalPortland's site engineer will develop and calculate an algorithmic formula to sync up their auger blender with their conveyor system so that they can meet the required uniform blend specification.

To eliminate the potential of carbon particles suspending in water column or floating to the surface, all filter material will be pre-wetted before placement. Material will be inspected both visually and physically to verify material has been pre-wetted enough for placement. Material will continue to be inspected through placement to make sure material does not dry out. Pre-wetting filter material will consist of a simple 2-in trash pump equipped with a fire hose attachment. Pre-wetted material will sit for 10 to 15 min before placement to maximize hydrogen bonding.

## 5.0 Methods, Procedures, and Equipment for Environmental Protection and Monitoring

During all in-water backfill placement activities, Anchor QEA will perform the required water quality monitoring to monitor compliance with the EPA Water Quality Memorandum. This monitoring will include the required physical and chemical sampling procedures. PPM will utilize methods to maximize environmental protection during placement of backfill. Some of the methods that will be utilized include:

- All backfill materials will have the required chemical analysis performed for a wide range of potential chemical constituents to ensure that the backfill is in compliance with the Construction Specifications.
- All backfill materials will be washed prior to delivery to reduce the percentage of fine fractions in the backfill. This will reduce turbidity in the water column.
- Containment booms will be used along the shoreline as backfill is being placed from the uplands to limit migration of turbid water being discharged from the shoreline through the backfill. Additionally, containment booms will be used downstream of the in-water backfill activities, if necessary, to limit turbidity migration.
- In-water backfill will be released from the bucket as close to the backfill surface as possible to minimize free-fall velocity of materials and therefore generation of excess turbidity.
- Interim backfill placement will not occur until dredging in the adjacent downstream DMU is approved as complete (e.g., backfill placement will not occur in DMU I until dredging is approved as complete in DMU II).
- Oil containment booms will be stockpiled on in-water equipment and utilized at the perimeter of the work zone to capture any potential leaks or spills, if they should occur. Additionally, precautions will be implemented during equipment fueling and is discussed in the Spill Prevention, Control, and Countermeasures Plan included as a separate attachment in the RAWP.

# 6.0 Source and Transportation of Backfill Material

## 6.1 Source

CalPortland's Seattle Aggregate Yard will supply all of the backfill, filter, riprap, and habitat substrate material. The waterway cap, filter material, habitat mix, and beach sand will be provided by CalPortland's Pioneer Aggregates (#B 335) in DuPont, WA. The cap armor and heavy loose Riprap material will be provided by CalPortland's White River Quarry (#2A487) in Enumclaw, WA.

## 6.2 Transportation & Storage of Material

The material will be transported to site via a combination of flat-deck barges and truck and trailers. Material for the shoreline areas will be placed directly in the backfill areas, however may be temporarily stockpiled if the aggregate supplier cannot keep with onsite production. If the material is stockpiled onsite the stockpiles will be covered with tarps to ensure stormwater does not come into contact with the material and create turbidity conditions. Material to be placed in-water will be delivered via barge. For the interim backfill activities, the material barge will be stored at PPM's main yard. When the backfill activities occur on Sunday, the barge will be brought to the site at that time. For final backfill activities, a barge a day will be delivered to the site. The material barge will be tied up to the backfill barge during placement activities. It will remain there until it is emptied and swapped with a full barge.

## 6.3 Notification and Procedures for Commercial Traffic

The Lower Duwamish Waterway is an active commercial vessel route and continuous coordination is required to ensure the navigation channel is clear when vessel movement is necessary.

PPM will notify the USCG by letter to the Commander, Thirteenth Coast Guard District, 915 2nd Avenue, Seattle, WA, 98174-1067, at least 14 days prior to the commencement of dredging, notifying the USCG to the start of dredging operations.
PPM shall keep the USCG apprised of the position of its equipment and shall notify them 24 hours in advance of changes of operations or equipment location. Signal lights shall be displayed in accordance with USCG Instruction Manual M16672.2 Navigation Rules, International-inland (COMPTINST M16672.2), 33 CFR 81 Appendix 'A' (international) and 33 CFR 84 through 33 CFR 89 (inland), as applicable.

In the event that the Contractor's construction equipment (dredges, barges, work boats, anchor buoys, etc.) obstructs any navigation channel or berthing areas as to make difficult or endanger the safe passage of vessels, said equipment shall immediately be moved on the approach of any vessel, to such an extent as may be necessary to afford a practical passage. PPM shall cooperate with other waterway users and coordinate directly with them for access and timing of operations.

## Figure 1- Dredge Management Units

| CONTROL POINTS | | |
|---|---|---|
| POINT # | NORTHING | EASTING |
| 1 | 195800.6 | 1275755.2 |
| 2 | 195787.9 | 1275763.7 |
| 3 | 195780.0 | 1275752.1 |
| 4 | 195683.7 | 1275816.1 |
| 5 | 195446.4 | 1275912.1 |
| 6 | 195448.5 | 1275917.7 |
| 7 | 195397.1 | 1275938.5 |
| 8 | 195395.9 | 1275935.7 |
| 9 | 195352.6 | 1275953.2 |
| 10 | 195355.5 | 1275960.7 |
| 11 | 195300.8 | 1275982.8 |
| 12 | 195665.0 | 1275731.0 |
| 13 | 195665.1 | 1275743.9 |
| 14 | 195665.2 | 1275754.6 |
| 15 | 195646.4 | 1275751.4 |
| 16 | 195633.8 | 1275767.2 |
| 17 | 195630.8 | 1275768.4 |
| 18 | 195665.4 | 1275776.1 |
| 19 | 195641.3 | 1275785.8 |

| CONTROL POINTS | | |
|---|---|---|
| POINT # | NORTHING | EASTING |
| 20 | 195665.5 | 1275791.3 |
| 21 | 195646.7 | 1275798.9 |
| 22 | 195665.7 | 1275813.8 |
| 23 | 195654.5 | 1275818.3 |
| 24 | 195605.3 | 1275796.4 |
| 25 | 195590.5 | 1275800.1 |
| 26 | 195591.5 | 1275802.1 |
| 27 | 195598.2 | 1275818.8 |
| 28 | 195605.6 | 1275837.5 |
| 29 | 195581.2 | 1275802.4 |
| 30 | 195561.2 | 1275810.6 |
| 31 | 195526.8 | 1275815.7 |
| 32 | 195527.7 | 1275818.2 |
| 33 | 195529.8 | 1275823.2 |
| 34 | 195540.8 | 1275850.6 |
| 35 | 195542.0 | 1275853.4 |
| 36 | 195545.4 | 1275861.8 |
| 37 | 195467.2 | 1275830.4 |
| 38 | 195468.6 | 1275833.8 |

| CONTROL POINTS | | |
|---|---|---|
| POINT # | NORTHING | EASTING |
| 39 | 195471.6 | 1275840.8 |
| 40 | 195475.3 | 1275850.3 |
| 41 | 195479.8 | 1275861.4 |
| 42 | 195484.7 | 1275873.4 |
| 43 | 195489.5 | 1275885.2 |
| 44 | 195400.6 | 1275846.8 |
| 45 | 195405.8 | 1275859.4 |
| 46 | 195412.4 | 1275875.6 |
| 47 | 195429.8 | 1275871.4 |
| 48 | 195433.5 | 1275880.2 |
| 49 | 195443.4 | 1275904.8 |
| 50 | 195444.8 | 1275908.6 |
| 51 | 195394.5 | 1275885.7 |
| 52 | 195409.9 | 1275924.0 |
| 53 | 195392.8 | 1275928.3 |
| 54 | 195337.0 | 1275862.5 |
| 55 | 195340.3 | 1275870.7 |
| 56 | 195342.6 | 1275876.4 |
| 57 | 195352.3 | 1275900.0 |

| CONTROL POINTS | | |
|---|---|---|
| POINT # | NORTHING | EASTING |
| 58 | 195353.2 | 1275902.4 |
| 59 | 195353.9 | 1275904.3 |
| 60 | 195360.2 | 1275919.8 |
| 61 | 195366.8 | 1275936.2 |
| 62 | 195340.2 | 1275922.9 |
| 63 | 195341.9 | 1275927.1 |
| 64 | 195348.7 | 1275943.5 |
| 65 | 195299.6 | 1275977.9 |
| 66 | 195333.0 | 1275863.4 |
| 67 | 195328.6 | 1275845.8 |
| 68 | 195289.8 | 1275855.4 |
| 69 | 195294.1 | 1275872.9 |
| 70 | 195280.2 | 1275876.5 |
| 71 | 195284.7 | 1275887.6 |
| 72 | 195286.8 | 1275892.4 |
| 73 | 195289.0 | 1275898.0 |
| 74 | 195296.9 | 1275917.8 |
| 75 | 195300.3 | 1275925.9 |
| 76 | 195303.0 | 1275932.9 |

| CONTROL POINTS | | |
|---|---|---|
| POINT # | NORTHING | EASTING |
| 77 | 195304.9 | 1275937.2 |
| 78 | 195316.9 | 1275967.1 |
| 79 | 195290.2 | 1275935.8 |
| 80 | 195298.8 | 1275973.7 |
| 81 | 195187.8 | 1275899.2 |
| 82 | 195189.1 | 1275905.4 |
| 83 | 195190.0 | 1275909.2 |
| 84 | 195197.2 | 1275940.4 |
| 85 | 195198.9 | 1275948.4 |
| 86 | 195200.7 | 1275956.1 |
| 87 | 195203.3 | 1275967.9 |
| 88 | 195211.4 | 1276003.0 |
| 89 | 195143.4 | 1275910.2 |
| 90 | 195144.6 | 1275915.5 |
| 91 | 195146.7 | 1275925.1 |
| 92 | 195154.1 | 1275957.3 |
| 93 | 195158.9 | 1275978.0 |
| 94 | 195161.1 | 1275988.1 |
| 95 | 195166.9 | 1276013.2 |

| CONTROL POINTS | | |
|---|---|---|
| POINT # | NORTHING | EASTING |
| 96 | 195167.7 | 1276017.2 |
| 97 | 195122.2 | 1275915.4 |
| 98 | 195122.0 | 1275930.8 |
| 99 | 195121.5 | 1275964.8 |
| 100 | 195121.1 | 1275997.3 |
| 101 | 195120.7 | 1276027.9 |
| 102 | 195301.7 | 1275986.6 |
| 103 | 195308.3 | 1276026.3 |
| 104 | 195703.5 | 1275867.8 |
| 105 | 195790.2 | 1275809.4 |
| 106 | 195790.2 | 1275787.3 |
| 107 | 195812.3 | 1275772.8 |

LEGEND:

- NAVIGATION CHANNEL
- EXISTING CONTOUR (1 FT INTERVAL)
- EXISTING BOEING SHEETPILE WALL
- CONTAINMENT BARRIER (BY OTHERS, DO NOT DISTURB, ALIGNMENT SUBJECT TO CHANGE)
- TEMPORARY SECURITY FENCE
- DREDGE/EXCAVATION LIMITS
- PROTECT EXISTING MONITORING WELL
- REQUIRED DREDGE ELEVATION (FT MLLW)
  TOP OF SIDESLOPE
  FINAL GRADE
  DREDGE COORDINATE
  DREDGE BOUNDARY (DENOTES CHANGE IN ELEVATION)
- SLOPE ARROW
- STRUCTURES TO BE PRESERVED AND PROTECTED ADJACENT TO DREDGE/EXCAVATION LIMITS
- TOE TRENCH TO BE CONSTRUCTED AT BASE OF 2H:1V BANK DREDGE/EXCAVATION SLOPE, SEE 1/C-10
- CONTROL POINT
- JFOS IMPACTED MATERIAL AREA - SCHEDULE A (SEE DRAWING C-5A)

NOTES:

1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD 83 FEET.
2. VERTICAL DATUM: MEAN LOWER LOW WATER (MLLW).
3. FINAL DREDGE MANAGEMENT UNIT (DMU) PLAN TO BE DEVELOPED AT PRE-CONSTRUCTION BASED ON CONTRACTORS EQUIPMENT AND APPROACH.
4. A NOMINAL 6-INCHES OF BACKFILL MATERIAL WILL BE PLACED OVER THE DREDGE OR EXCAVATION CUTS WITHIN A DMU, AS SOON AS PRACTICAL, AFTER THE DREDGING AREA IS COMPLETED AND ACCEPTED BY THE ENGINEER.
5. IN-WATER DREDGE/EXCAVATION LIMIT WILL BE DEFINED BY A 2H:1V CATCH SLOPE FROM THE TOE OF CUT.

PROTECT CONTAINMENT BARRIER (INSTALLED BY OTHERS, ALIGNMENT SUBJECT TO CHANGE)

MAINTAIN 5' OFFSET FROM BUILDING

MAINTAIN 5' OFFSET FROM CONCRETE PAD

PROPERTY LINE

APPROXIMATE 2H:1V SLOPE TRANSITIONS TO EXISTING GROUND AT 5' OFFSET FROM WALL

WALL OFFSET (5' MIN)

DMU 6

DMU 5

DMU 4

DMU 3

DMU 2

DMU 1

42" Boeing Outfall Pipe

24" Boeing Outfall Pipe

APPROXIMATE BOEING DREDGE AREA (TO BE COMPLETED BY OTHERS)

LOWER DUWAMISH WATERWAY

NORTH

0 30 60

SCALE IN FEET

ONE INCH AT FULL SIZE. IF NOT ONE INCH SCALE ACCORDINGLY

REVISED BID SET 02-05-14

K:\Projects\0224-Fwalton Consulting\Jorgensen Forge Facility EE-CA Implement\Construction Plans\0224-C-Dredge.dwg 6 C-1

Feb 04, 2014 5:19pm rgoode

ANCHOR QEA

*EARLE M. JORGENSEN COMPANY*

BRYAN PATRICK BARTH STATE OF WASHINGTON 41775 REGISTERED PROFESSIONAL ENGINEER

| REVISIONS | | | | |
|---|---|---|---|---|
| REV | DATE | BY | APP'D | DESCRIPTION |
| 1 | 12-16-13 | | | ADDENDUM #2 |
| 2 | 1-28-14 | | | CONTAINMENT BARRIER WALL CHANGES |

DESIGNED BY: R. PICKERING
DRAWN BY: T. GRIGA
CHECKED BY: J. VERDUIN
APPROVED BY: R. BARTH
SCALE: AS NOTED
DATE: NOVEMBER 2013

**JORGENSEN FORGE EARLY ACTION AREA**

**DREDGE/EXCAVATION PLAN**

**C-1**

SHEET NO. 6 OF 17

## Figure 2- Backfill Equipment Positioning

N

LEGEND:

- NAVIGATION CHANNEL
- EXISTING CONTOUR (1 FT INTERVAL)
- SAND BAG/FILTER GRAVEL BERM
- APPROXIMATE TOP OF BANK
- EXISTING BOEING SHEETPILE WALL
- CONTAINMENT BARRIER (DO NOT DISTURB)
- TEMPORARY SECURITY FENCE
- STRUCTURES TO BE PRESERVED AND PROTECTED ADJACENT TO DREDGE/EXCAVATION LIMITS

MAIN BUILDING

PROPERTY LINE

PROPERTY LINE

**1200 HITACHI EXCAVATOR**

**CAP BARGE "WEB" 142' X 60'**

**BACKFILL BARGE "KP1 OR KP2" 180' X 50'**

0 15' 30' 60' 90'

1" = 30'-0"



| NO. | ISSUE/DESCRIPTION | BY | DATE |
|---|---|---|---|
| | | | |



# JORGENSEN FORGE EARLY ACTION AREA
# DUWAMISH WATERWAY
# SEATTLE, WASHINGTON

## BACKFILL EQUIPMENT LAYOUT PLAN VIEW

PREPARED BY:
Pacific Pile & Marine
Pacific Pile & Marine, LP
Seattle Office
582 South Riverside Drive
Seattle, WA 98108

PREPARED FOR:
EARLE M. JORGENSEN COMPANY

| | | | |
|---|---|---|---|
| PROJ MGR: JC | REVIEWED BY: JC | CHECKED BY: JC | FIGURE 5 |
| DESIGNED BY: JC | DRAWN BY: JC | SCALE: AS NOTED | |
| DATE: 03/14/2014 | PROJECT NO. | REVISION NO. 0 | SHEET NO. 1 OF 1 |